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Fig. 1.

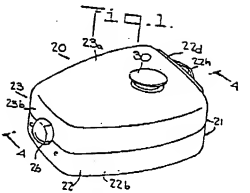
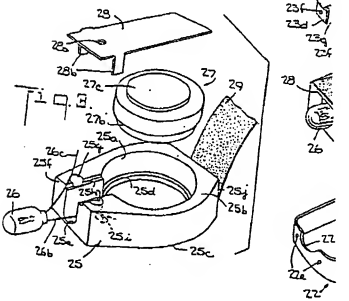


Fig. 3.



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1058466 COMPLETE SPECIFICATION

2 SHEETS *This drawing is a reproduction of the Original on a reduced scale*

Sheet 1

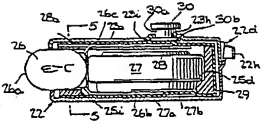

Fig.4.

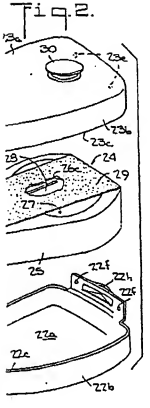

Fig.2.

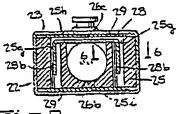

Fig.5.

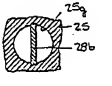

Fig.6.

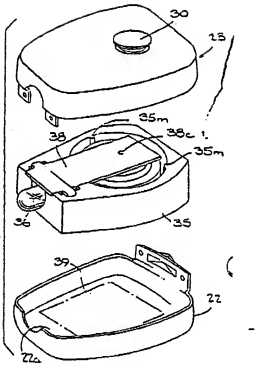

Fig. 7.

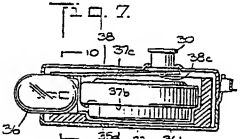

Fig. 9.

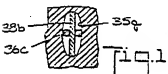

Fig. 12.

PATENT SPECIFICATION

DRAWINGS ATTACHED

Inventor: SIDNEY SCHWARTZ

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1,058,466

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Index at acceptance: —F4 R(1E1A, 1E1B2, 1E2)
Int. Cl.: —F 21 t

COMPLETE SPECIFICATION

Miniaturized Flashlight with Replacement Cartridge Unit

We, BANTAM-LITE, INC., a corporation organised under the laws of the State of New York, United States of America, of 137, West 27th Street, New York 1, New York, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to portable lighting devices and more particularly is directed to a battery-bulb-switch cartridge unit of improved and simplified construction for use in a wide variety of miniaturized flashlight incorporating devices, such as keychain fobs and other articles of jewellery, pocket size keycases and address books, toys and the like.

Among the objects of the invention is to provide an improved miniaturized cartridge unit and a casing therefor, the latter being adaptable to provide a variety of different articles, such as decorative keychain fobs, cuff links, tie bars, charms and the like in which the illuminable feature may serve a primary function as a pocket flashlight or serve a secondary novelty function in which the illuminable bulb is incorporated into the design of the article. The miniaturized cartridge unit shall comprise few and simple parts that are easy to assemble by low cost quantity production into a reliable and dependable miniaturized flashlight capable of withstanding rough and hard usage, which parts shall include a battery, light bulb and pressure operated switch combined in a novel and simple holder, which miniaturized cartridge unit shall utilize the longer life and smaller size alkaline-mercury battery in combination with a bulb and a simple switch whereby a relatively inexpensive unit is available for replacement of a defective unit without the user being required to determine the cause of the defect, which shall be foolproof in operation and practical and efficient to a high degree in use.

Other objects of the invention will in part be obvious and in part hereinafter pointed out.

The invention accordingly consists of features of construction, combinations of elements and arrangements of parts which will be exemplified in the constructions hereinafter disclosed, the scope of the application of which will be indicated in the claims following.

In the accompanying drawing in which various illustrative embodiments of the invention are shown:

Fig. 1 is a perspective view showing the front, top and right side of a keychain flashlight fob incorporating a battery-bulb-switch catridge unit constructed to embody the invention.

Fig. 2 is an exploded view of the fob flashlight in Fig. 1 showing the casing halves and the cartridge unit.

Fig. 3 is an exploded view of the battery-bulb-switch cartridge unit in Fig. 2 removed from the casing and showing details of the holder for combining the battery, bulb and switch into an operative, replacable unit.

Fig. 4 is a sectional view taken on line 4—4 in Fig. 1 showing the interior construction of the assembled flashlight fob.

Fig. 5 is a sectional view taken on line 5—5 in Fig. 4.

Fig. 6 is an enlarged fragmentary sectional view taken on line 6—6 in Fig. 5 showing details of the manner of mounting the leaf spring switch to the holder.

Fig. 7 is an exploded view of a flashlight similar to Fig. 1 but having a modified form of battery-bulb-switch cartridge unit.

Fig. 8 is an exploded view of the modified form of cartridge unit shown in Fig. 7.

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Fig. 9 is a sectional view similar to Fig. 4 but showing the modified construction of Figs. 7 and 8.

Fig. 10 is a sectional view taken on line 10—10 in Fig. 9.

Fig. 11 is a fragmentary bottom plan view of the battery end of the cartridge unit showing the lead extending across the battery bottom for clamping.

Fig. 12 is an enlarged fragmentary sectional view taken on line 12—12 in Fig. 10 showing details of the electrical contact engagement between one of the bulb leads and one of the mounting tabs of the switch.

Referring in detail to the drawing, 20 denotes an illuminable fob suitable for carrying on a keychain or incorporating into other articles of jewellery, such as cuff links, tie bars, charms and the like, seen to comprise a casing 21 containing battery-bulb-switch cartridge unit 24 constructed to embody the invention.

Casing 21 may be made of any suitable material and constructed for easy access to the interior for replacement of cartridge unit 24. For application of the invention to jewellery-type articles, casing 21 is shown in the drawing as made of a suitable metal and comprises dished shaped casing halves 22 and 23 releasably secured together in open face abutment, casing half 22 having a flat wall 22a and a peripheral side wall 22b terminating in an edge 22c lying substantially in a single plane, the other casing half 23 having a flat wall 23a and a peripheral side wall 23b terminating in an edge 23c for registering with edge 22c forming an abutment closure joint for casing 21. Cut back from edges 22c and 23c and centralized in a front portion of walls 22b and 23b are recesses 22g and 23g shaped to provide an opening in casing 21 through which light bulb 26 extends. The latter is of the kind having no base cap and provided with freely trailing conductor leads called "pigtail leads" herein.

Releasable securing means between casing halves 22 and 23 are shown to include a pair of tabs 23d, an elongated, that is, wide or broad tab 22d, a pair of openings 22e formed in a front portion of wall 22b and a pair of openings 23e formed in a rear portion of wall 23b. Tabs 23d may be integrally formed to project from a front portion of wall 23b on opposite sides of recess 23g and are inwardly offset at edge 23e to abut the interior surface of opposite casing half wall 22b, tabs 23d being formed with protuberances 23f for registering with and engaging openings 22e. Elongated tab 22d may be integrally formed to project from a rear portion of wall 22b and is outwardly offset at edge 22e to abut the exterior surface of opposite casing half wall 23b, tab 22d being formed with a pair of spaced protuberances 22f for registering with and engaging openings 23e. The central portion of elongated tab 22d between protuberances 22f may be slightly bowed outwardly to facilitate insertion of the fingernail to flex tab 22d away from wall 23b for disengaging protuberances 22f from openings 23e for separation of casing halves 22 and 23 in the manner hereinafter described. The central portion of elongated tab 22d may also have stamped therefrom a terminal link 22h for connecting casing 21 to a keychain in the well understood manner.

Casing half 23 may be provided with a suitable push button 30 for operating a pressure actuated switch in cartridge 24. Push button 30 may include a neck 30a of reduced cross-sectional area extending through opening 23h formed in flat wall 23a, neck 30a terminating in an interior flange 30b serving to retain button 30 on wall 23a and as a pressure plate for said switch. To conserve space within casing 21, opening 23h may have a raised edge border forming an interior seat 23i to accommodate flange 30b, as seen in Fig. 4.

One of the features of the invention is the simplified construction of battery-bulb-switch cartridge unit 24 seen in Figs. 3, 4, 5 and 6 to comprise a holder 25 for locating light bulb 26, battery 27 and leaf spring switch 28 in operative relation with adhesive tape 29 binding the parts together as a replaceable and disposable unit.

Holder 25 may be molded of any suitable electrically non-conductive resinous plastic, such as polystyrene, to provide a cavity 25a sized and shaped to accommodate disc shaped miniature battery 27. Cavity 25a is formed as a relatively large through-opening adjacent the rear of holder 25, extending from top surface 25b to bottom surface 25c where a constricting ledge or shoulder 25d retains battery 27. A cradle 25e for light bulb 26 extends from cavity 25a through front surface 25f and may be open along top surface 25b and closed at bottom surface 25c. A pair of bores 25g located on opposite sides of cradle 25e extend from top surface 25b through holder 25 and a pair of cutbacks 25h from top surface 25b are formed in the opposite walls of cradle 25e to seat leaf spring switch 28 in the manner hereinafter more fully described.

Leaf spring switch 28 may be made of any suitable resilient metal preferably having corrosion resistant properties, such as brass alloy or stainless steel, and as seen in Fig. 3 is stamped and formed as a flat plate having an opening 28a and a pair of lateral tabs 28b bent at right angles to the plane of the plate, both opening 28a and table 28b being located adjacent a front end of the switch.

Light bulb 26 may be of any conventional miniature type formed with an integral lens tip 26a and a pair of pigtail leads 26b and 26c. Battery 27, which may also be of any conventional construction but of a disc or

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button shape and alkaline-mercury type, is seen to have a casing forming one terminal with a bottom 27a extending beyond shoulder 27b and a top or cap 27c projecting above and electrically insulated from the casing forming the other terminal in the well understood manner.

The assembly of cartridge unit 24 will now be apparent. Battery 27 may first be positioned in cavity 25a of holder 25 so that battery shoulder 27b rests on shoulder 25d exposing battery bottom 27a through the opening in the holder bottom surface 25c. As seen in Figs. 3, 4 and 5, bottom wall of cradle 25e is notched to provide a recess 25i from cavity 25a where it opens upon bottom surface 25c. One of the pigtail leads 26b is inserted through recess 25i to extend along battery bottom 27a. The other pigtail lead 26c is inserted through opening 28a in switch 28 and the latter anchored in position on holder 25 by press fitting tabs 28b into bores 25 and seating switch 28 on cutbacks 25b. Adhesive tape 29 is then applied to extend across top surface 25b, down the rear surface 25j and across the bottom surface 25c of holder 25 thereby retaining the lead 26c extending through switch openings 28a in electrical contact with switch 28 and retaining the other lead 26b extending through recess 25i in electrical contact with battery bottom 27a. Adhesive tape 29 in adhering to battery bottom 27a serves to retain battery 27 in seated position on shoulder 25d. As seen in Fig. 4, switch 28 in being seated on cutbacks 25h and anchored in bores 25g extends across battery terminal cap 27c and is normally spaced therefrom in open switch position.

Pressure on adhesive tape 29 above battery terminal cap 27c flexes switch 28 to contact said terminal and close the circuit to energize light bulb 26.

Illuminable fob 20 is readily assembled with cartridge unit 24 by first placing the latter into casing half 23 so that top surface 25b lies against the interior of flat wall 23a with interior flange 30b of push button 30 positioned to actuate switch 18. Tabs 23d are then positioned against the interior surface of side wall 22b of casing half 22 with protuberances 23f engaging in openings 22e and bringing edges 22c and 23c into abutment at the front of casing 21. Upon application of slight pressure, edges 22c and 23c are also brought together at the rear of casing 21, elongated tab 22d being flexed slightly to permit protuberances 22f to engage openings 23e, completing the assembly of fob 20.

In order to replace cartridge unit 24, the fingernail may be inserted between elongated tab 22d and side wall 23b outwardly flexing tab 22b to readily disengage protuberances 22f from openings 23e for separation of casing halves 22 and 23. A new cartridge unit 24 is then inserted into casing half 23 and casing 23 assembled in the manner hereinbefore described.

A modified form of cartridge unit 34 which eliminates the adhesive tape 29 of unit 24 is shown in Figs. 7 to 12, inclusive, to comprise holder 35, light bulb 36, battery 37 and leaf spring switch 38 all substantially similar to the parts comprising unit 24.

Holder 35 has cavity 35a, top surface 35b, bottom surface 35c, shoulder 35d, cradle 35e, bores 35g and cutbacks 35h all similar to those of holder 25. In order to retain battery 37 in a desired seated position in cavity 35a against accidental displacement a plurality of ribs 35m and 35n are provided spaced from each other on the interior wall of cavity 35a to frictionally engage the battery casing. Ribs 35m are located on the larger diameter portion of cavity 35a above shoulder 35d while ribs 35n, which may or may not be offset with respect to ribs 35m, are located on the smaller diameter portion of cavity 35a below shoulder 35d.

Light bulb 36 may be provided with one relatively long lead 36b and one relatively short lead 36c, the latter, as is clear from Figs. 10 and 12, having an end portion extending into one of the bores 35g where it is retained in electrical contact with one of the tabs 38b of leaf spring switch 38. Long lead 36b extends into cavity 35a where it passes along battery bottom 37a and terminates in an end portion clamped between the interior surface of cavity 35a and the casing of battery 37. Any other suitable means may be employed for insuring adequate electric contact between leads 26b and 26c and battery bottom 37a and leaf spring switch 38, respectively, as for example by spot welding.

In order to prevent accidental short circuiting of battery terminals 37a and 37c through casing halves 22 and 23, shoulder 35d may be spaced above bottom surface 35c of holder 35 to locate battery bottom 37a and lead 36b a sufficient, insulating distance from flat wall 22a of casing half 22 when battery shoulder 37b rests on shoulder 35d as is clear from Fig. 9. As an alternative or added precaution a strip of insulating material 39 may be adhered to the interior surface of flat wall 22a as indicated in broken lines in Fig. 7.

As seen in Figs. 9 and 10, leaf spring switch 38 is anchored at one end to holder 35 by tabs 38b being a press fit into bores 35g and is normally disposed at a slight incline to holder top surface 35b for retaining button 30 in a projected position and for clearing battery terminal cap 37c. A contact depression 38c may be provided adjacent the free end of spring 38.

Cartridge unit 34 may be inserted in casing 21 in the same manner as hereinbefore described for unit 24. Illuminable fob 20 fitted with either cartridge unit 24 or 34 may be operated by depressing push button 30, there-

by downwardly flexing spring switch 28 or 38 and closing the circuit to battery terminal cap 27c or 37c, respectively. Upon release of push button 30 spring switch 28 or 38 will return to the normal open circuit position.

It is thus seen that there is provided an improved miniature flashlight with battery-bulb-switch cartridge units whereby the several objects of this invention are achieved and which are well adapted to meet the conditions of practical use.

As various possible embodiments might be made of the above invention, and as various changes might be made in the embodiments above set forth, it is to be understood that all matters herein set forth or shown in the accompanying drawing are to be interpreted as illustrative and not in a limiting sense.

WHAT WE CLAIM IS:—

1. A flashlight cartridge unit comprising a holder of electrically non-conductive material having a top surface, a cavity formed in said holder adjacent a rear end thereof and having a large opening communicating with said top surface, a disc shaped battery having a bottom casing forming a first terminal and an upper cap insulated from the casing forming a second terminal; said battery being seated in said cavity with the second terminal positioned in said top surface opening, a cradle formed in said holder extending from said cavity and opening on a front end of said holder, an electric light bulb positioned in said cradle and having a tip extending through said front end opening, said light bulb having a pair of pigtail leads, a first of said leads extending into said cavity and electrically contacting said first battery terminal, a leaf spring switch anchored at one end to the holder and having a free end extending across said top surface opening normally spaced from said second battery terminal and adapted to flex into contact therewith for closing the circuit to the light bulb, a second of said pigtail leads electrically contacting said spring, means for retaining said battery in a fixed position in said cavity, and means for retaining said leads in respective contact with said first battery terminal and said switch.

2. The flashlight cartridge unit defined in claim 1 in which the holder has a bottom surface formed with an opening communicating with said cavity exposing the battery casing bottom, said battery retaining means and said lead retaining means being an adhesive tape strip extending along and being adhered to the holder top surface and spring, to at least one side of the holder and to the holder bottom surface and battery casing bottom, an end portion of said first lead being interposed between said battery bottom and said adhesive tape strip, and an end portion of said second lead being interposed between said spring and said adhesive tape strip.

3. The flashlight cartridge unit defined in claim 1 in which said holder has a pair of bores, one located on each side of said cradle and opening at said top surface, said leaf spring switch having a pair of lateral tabs bent at right angles thereto and being a press fit into said bores as said anchorage to the holder.

4. The flashlight cartridge unit defined in claim 1 in which said holder has a pair of bores, one located on each side of said cradle and opening at said top surface, said leaf spring switch having a pair of lateral tabs bent at right angles thereto and being a press fit into said bores as said anchorage to the holder, an end portion of said second lead extending into one of said bores serving as said lead and switch contact retaining means.

5. A flashlight cartridge unit as claimed in Claim 1 wherein the cavity has an interior side wall formed with a plurality of spaced ribs, a pair of bores are formed in said holder, one bore located on each side of said cradle, the second of said pigtail leads extending into one of said bores, said battery being sized to snugly seat in said cavity in tight frictional contact with said spaced ribs and with said first lead clamped between said first terminal and cavity wall providing electrical contact between said first lead and first terminal, said second battery terminal being positioned in said top surface opening, the leaf spring switch having a pair of bent tabs, each tab being a press fit into one of said bores to anchor the spring to said holder, said second lead being retained in electrical contact with one of said tabs within its bore.

6. A flashlight cartridge unit as claimed in Claim 3, wherein the holder of electrically non-conductive material has top and bottom surfaces, an opening extending through said holder from top to the bottom surfaces adjacent a rear end thereof, said battery casing having a reduced diameter bottom portion forming a shoulder, said holder opening being sized to receive said battery through the top of the holder and having an interior shoulder seating said battery shoulder thereon, and means for retaining said battery against displacement from said shoulder to shoulder seating.

7. The flashlight cartridge unit defined in claim 6 in which said battery retaining means and said lead retaining means is an adhesive tape strip extending along and being adhered to said holder top surface and spring switch, to at least one side of the holder and to the holder bottom surface and battery bottom surface, an end portion of said first lead being interposed between said battery bottom surface and said adhesive tape strip, and an end portion of said second lead being interposed between said spring and said adhesive tape strip.

8. The flashlight cartridge unit defined in

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claim 6 in which said battery retaining means include a plurality of spaced ribs projecting from the wall of said holder opening frictionally engaging said battery casing.

9. The flashlight cartridge unit defined in claim 6 in which said lead retaining means includes an end portion of said second lead extending into one of said bores and being clamped therein in electrical contact with said tab, and an end portion of said first lead extending into said holder opening and being clamped between the battery casing and the wall of the opening.

10. A miniature illuminable fob including a flashlight cartridge unit as claimed in Claim 1 having a casing comprising two separable casing halves, each being dish shaped to include a substantially flat wall and a peripheral side wall terminating in a free edge forming an abutment closure joint with the free edge of the other casing half, the flat wall of one of said casing halves having an opening with a push button mounted therein, a front portion of each of said side walls having a centralized recess forming an opening in the casing, a replaceable battery-bulb-switch cartridge unit as claimed in claim 1 positioned within said casing having said bulb located in alignment with said opening and said leaf spring switch positioned for actuation by finger pressure on said push button, and means releasably retaining said casing halves in said edge abutment.

11. The miniature illuminable fob defined in claim 10 in which said releasable retaining means includes a first tab extending from the front side wall portion of one of said casing halves being inwardly offset from the free edge thereof and abutting the interior surface of the front side wall portion of the other of the casing halves, a second broad tab extending from a rear side wall portion of said other casing half being outwardly offset from the free edge thereof and abutting the exterior surface of the rear side wall portion of said first mentioned casing half, said tabs and abutting wall portions having male and female interlocking means, said broad tab being resilient to permit disengagement of said interlocking means or insertion of the fingernail between the broad tab and its abutting wall portion.

12. The miniature illuminable fob defined in claim 10 in which said releasable retaining means includes a pair of tabs extending from the front side wall portion of one of said casing halves located on opposite sides of said recess inwardly offset from the free edge thereof and abutting the interior surface of the front side wall portion of the other casing half, bread tab extending from a rear side wall portion of said other casing half being outwardly offset from the free edge thereof and abutting the exterior surface of the rear side wall portion of said first mentioned casing half, said tabs and abutting wall portions having male and female interlocking means, said broad tab having a central portion cut and stamped therefrom providing a closed link for connecting said casing to a chain.

13. A miniature illuminable fob including a flashlight cartridge unit as claimed in claim 1, having a casing comprising two separable casing halves, each being dish shaped to include a substantially flat wall and a peripheral side wall terminating in a free edge forming an abutment closure joint with the free edge of the other casing half, a flat wall of one of said casing halves having an opening with a push button mounted therein, a front portion of each of said side walls having a centralized recess forming an opening in the casing, a replaceable flashlight cartridge unit as claimed in claim 1 including a holder positioned in said casing with said light bulb tip aligned with said casing opening and the leaf spring switch engaging said push button, the latter being adapted to flex said switch to contact said second battery terminal for closing the circuit to the light bulb, and means releasably retaining said casing halves in said edge abutment.

14. The flashlight cartridge unit defined in claim 1 in which said means for retaining said leads in respective contact with the first battery terminal and switch is spot welding.

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